

Nanochemistry and biotechnology

Morphofunctional changes in the reproductive system of juvenile rats following nanosilver administration

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Nanomaterials are widely spread nowadays, expanding from the labs to our everyday life. One of the most promising nanometals is silver, whose antibacterial effects made it a valuable medical material. Now silver nanoparticles can be found in cosmetics, food products, household chemical goods etc. That's why we should be aware of possible toxic effects of such particles, especially talking about reproductive system.

Our experiment was carried out on 1-month-old albino rats. The animals received intraperitoneal injections of 10-nm silver particles at 1 mg/kg bw dose for 10 days. We measured the diameter of seminiferous tubules and thickness of spermatogenic epithelium as markers of the sperm-production function of testes. Also we measured cross-sectional area of Leydig cells' nuclei as markers of sex-steroid production.

We showed that injections of nano-Ag resulted in decrease in all of the morphological parameters, although no significant pathological changes in the histoarchitecture of the organ were found. The thinning of spermatogenic epithelium (mainly due to the lower quantity of round spermatids) is the sign of slowed proliferation processes, which may lead to malfunctions in sperm production. Regarding the fact that experimental animals were immature, loss in endocrine function of the testes (observed as smaller nuclei of interstitial cells) could result in abnormal timing of puberty. Although the exact mechanism of such effects is the subject for further investigations, our data clearly showed that Ag particles should be used in everyday materials more carefully, taking into account possible negative effects.